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TRANSMITTAL FORM (to be used for all correspondence after initial filing)		Application Number	10/007,955
		Filing Date	December 7, 2001
		First Named Inventor	Abbas Arian
		Art Unit	2837 ✓
		Examiner Name	S. Y. Hsieh
Total Number of Pages in This Submission	21	Attorney Docket Number	1391-27000 DVF

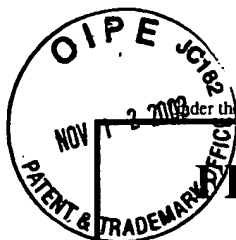
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☐ Applicant claims small entity status. See 37 CFR 1.27**TOTAL AMOUNT OF PAYMENT**

\$ 640.00

Complete if Known

Application Number	10/007,955
Filing Date	December 7, 2001
First Named Inventor	Abbas Arian
Examiner Name	S. Y. Hsieh
Group Art Unit	2837
Attorney Docket No.	1391-27000

METHOD OF PAYMENT (Check all that apply)☐ Check ☐ Credit Card ☐ Money Order ☐ Other ☐ None☒ Deposit Account:

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☒ Charge fee(s) indicated below☒ Charge any additional fee(s) during the pendency of this application☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account☒ Credit any overpayments**FEE CALCULATION****1. BASIC FILING FEE**

Large Entity		Small Entity		Fee Description	Fee Paid
Fee	Code (\$)	Fee	Code (\$)		
1001	750	2001	375	Utility filing fee	\$
1002	330	2002	165	Design filing fee	\$
1003	520	2003	260	Plant filing fee	\$
1004	750	2004	375	Reissue filing fee	\$
1005	160	2005	80	Provisional filing fee	\$

SUBTOTAL (1) \$00.00**2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE**

	Total Claims	Extra Claims	Fee from below	Fee Paid
	20** = 0	x	18.00	= \$ 00.00
Independent Claims	3** = 0	x	84.00	= \$ 00.00
Multiple Dependent			280.00	= \$ 00.00

Large Entity		Small Entity		Fee Description
Fee	Code (\$)	Fee	Code (\$)	
1202	18	2202	9	Claims in excess of 20
1201	84	2201	42	Independent Claims in excess of 3
1203	280	2203	140	Multiple dependent claim, if not paid
1204	84	2204	42	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) \$00.00

** or number previously paid, if greater; For Reissues, see above

SUBMITTED BY

Name (Print/Type)

DEREK V. FORINASH

Registration No.
(Attorney/Agent)

47,231

Telephone

(713) 238-8000

Signature

Date

November 7, 2003

FEE CALCULATION (continued)**3. ADDITIONAL FEES**

Large Entity		Small Entity		Fee Description	Fee Paid
Fee	Code (\$)	Fee	Code (\$)		
1051	130	2051	65	Surcharge - late filing fee or oath	\$
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	\$
1053	130	1053	130	Non-English specification	\$
1812	2,520	1812	2,520	For filing a request for <i>ex parte</i> reexamination	\$
18042	920*	1804	920*	Requesting publication of SIR prior to Examiner action	\$
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	\$
1251	110	2251	55	Extension for reply within first month	\$
1252	410	2252	205	Extension for reply within second month	\$
1253	930	2253	465	Extension for reply within third month	\$
1254	1,450	2254	725	Extension for reply within fourth month	\$
1255	1,970	2255	985	Extension for reply within fifth month	\$
1401	320	2401	160	Notice of Appeal	\$320.00
1402	320	2402	160	Filing a brief in support of an appeal	\$320.00
1403	280	2403	140	Request for oral hearing	\$
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1460	130	1460	130	Petitions to the Commissioner	\$
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123	50	123	50	Petitions related to provisional applications	\$
1806	180	1806	180	Submission of Information Disclosure Stmt	\$
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	\$
1809	750	2809	375	Filing a submission after final rejection (37 CFR § 1.129(a))	\$
1810	750	2810	375	For each additional invention to be examined (37 CFR § 1.129(b))	\$
1801	750	2801	375	Request for Continued Examination (RCE)	\$
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NOTICE OF APPEAL FROM THE EXAMINER TO THE BOARD OF PATENT APPEALS AND INTERFERENCES		Docket Number (Optional) 1391-27000 DVF	
I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to " Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" on November 7, 2003. Signature <u>M. A. Crabtree</u> Typed or printed Name <u>M. A. CRABTREE</u>		In re Application of: Abbas Arian	
		Application Number: 10/007,955	Filed: 12/07/2001
		For: Wideband Isolator for Acoustic Tools Art Unit: 2837 Examiner: S. Hsieh	
Applicant hereby appeals to the Board of Patent Appeals and Interferences from the last decision of the examiner.			
The fee for this Notice of Appeal is (37 CFR 1.17(b))		\$ 320.00	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee shown above is reduced by half, and the resulting fee is:		\$	
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<input type="checkbox"/> applicant/inventor.		Signature <u>Derek V. Forinash</u>	
<input type="checkbox"/> assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(B) is enclosed. (Form PTO/SB/96)		11/14/2003 AMONDAF1 00000025 032769 10007955 01 FC:1401 330.00 DA	
<input checked="" type="checkbox"/> attorney of record. Registration number 47,231		DEREK V. FORINASH Typed or printed name	
<input type="checkbox"/> attorney or agent acting under 37 CFR 1.34(a) Registration number if acting under 37 CFR 1.34(a) _____		2003	
NOTE: Signature of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required., see below*.			
<input checked="" type="checkbox"/> *Total of 1 forms are submitted.			

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS & INTERFERENCES

Appl. No. : 10/007,955
Applicants : Abbas Arian and Randall Jones
Filed : December 7, 2001
For : Wideband Isolator for Acoustic Tools

TC/A.U. : 2837
Examiner : S. Y. Hsieh

Confirmation No.. 3449

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APPEAL BRIEF

Att'y Docket No. 1392-27000
Client Ref. No.: 2000-IP-004077
Date: November 7, 2003

Mail Stop Appeal Brief - Patent
Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This paper is filed in concurrently with a Notice of Appeal for the above-styled matter.

I. REAL PARTY IN INTEREST

The real party in interest is the Assignee Halliburton Energy Services, Inc.

II. RELATED APPEALS AND INTERFERENCES

None.

III. STATUS OF THE CLAIMS

Originally filed claims: 1 – 26.

Claim 19 was amended in an after-final response filed concurrently with the Notice of Appeal and this Appeal Brief. No new claims have been presented. Claims 2, 3, 12, 13, 17, 25, and 26 are allowed. Claim 19 is objected to. Claims 1, 4-11, 14-16, 18, and 20-24 stand rejected.

11/14/2003 AMQNDAF1 00000025 032769 10007955

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IV. STATUS OF AMENDMENTS

It is assumed that the amendments presented to claim 19 in the after-final response has been entered for purposes of appeal.

V. SUMMARY OF THE INVENTION

The specification discloses a system and related method for attenuating acoustic signals in a wellbore. Acoustic transmitters and receivers are often deployed in a wellbore on a single tool. Acoustic signals are broadcast into the surrounding formation by the transmitter. Specification, paragraph [0003]. The reflected acoustic signals are detected by the receiver and analyzed to reveal important information regarding the formation. *Id.* The performance of a tool can be negatively affected by the receivers detecting signals that have not passed through the formation but travel within or along the body of the tool. Specification, paragraph [0005].

In order to address these difficulties, the embodiments are directed to a tool including an acoustic isolator that "serves to restrict the propagation of acoustic signals along the length of the logging tool." Specification, paragraph [0011]. The acoustic isolator is disposed between a transmitter and a receiver and comprises a plurality of modules coaxially arranged in series, forming a portion of the body of the tool. Specification, paragraph [0012]. The modules have the primary purpose of attenuating acoustic signals traveling along the tool but are also configured to be able to withstand axial loading that may be encountered during use. Specification, paragraph [0010]. The modules are not designed to attenuate these high axial loads, but merely absorb the loading and continue attenuating acoustic signals once the loading is removed. Specification, paragraph [0033].

Applicant's Figure 3, reproduced immediately below, is exemplary of the described apparatus.

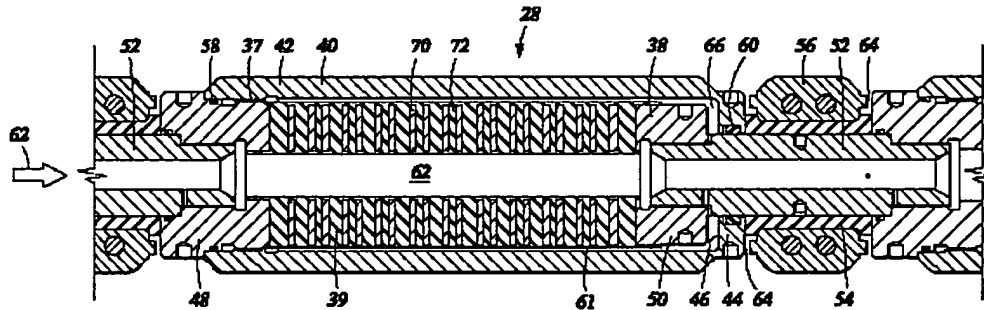


Fig. 3

"[R]eferring to Figure 3, each isolator module 28 comprises a spring 38, an outer housing 40, a connector rod 52, an resilient spacer 54, and a metal spacer 56." Specification, paragraph [0023]. Spring 38 is fully coated with a resilient material 39 and connected at each end 48, 50 to a connector rod 52. Specification, paragraph [0024].

High frequency acoustic signals enter the isolator module 28 at the upper end 48 of the spring 38 and travel through spring 38 and outer housing 40. Specification, paragraph [0029]. Sound waves traveling axially down the spring 38 will be attenuated by the multiple interfaces between the spring 38 and the resilient material 39 and will have to follow the coils of the spring 38, thereby greatly increasing the travel distance of the signal. *Id.* Signals traveling through the outer housing 40 will attenuate as they cross seal 60 to continue down the tool. *Id.* Low frequency acoustic signals are attenuated by the combination of the flexibility of the spring 38 and the metal spacers 56 acting as nodal masses, which help to damp out and attenuate this low frequency, long wavelength signal. Specification, paragraph [0030].

Although the flexibility of the isolator is critical to signal attenuation, this flexibility is detrimental to the isolator's ability to withstand forces that may be encountered downhole. Specification, paragraph [0031]. For example, downhole tools can be subjected to high axial loads if the tool were to become stuck in the wellbore. *Id.*

Axial loads are transmitted from the connector rods 52 into the spring 38. A compressive load applied in the direction of arrow 62 will compress spring 38 and close compression gaps 64 until the housing 40 contacts the metal spacer 56 and the load is transferred directly from the outer housing 40 to the metal spacer 56 and into the next outer housing 40. Specification, paragraph [0032]. A tension load applied opposite arrow 62 will elongate spring 38 until tension gap 66 is closed and the load is carried through the outer housing 40. Specification, paragraph [0033]. Thus, housing 40 limits the deflection of spring 38 under axial loading.

Thus, this arrangement provides a tool that is able to withstand the high axial loads associated with downhole use while providing excellent attenuation performance.

VI. ISSUE

Whether the combination of *Hoyle* (U.S. Patent No. 5,036,945) taken with *Blake* (U.S. Patent No. 3,770,232) renders obvious the independent claims of the present application.

VII. GROUPING OF THE CLAIMS

Claims 1, 5-7, 8-9, 11, 14-16, 18, and 22-23 stand together for purposes of this appeal.

Claims 4, 10, 20-21, and 24 stand together for purposes of this appeal.

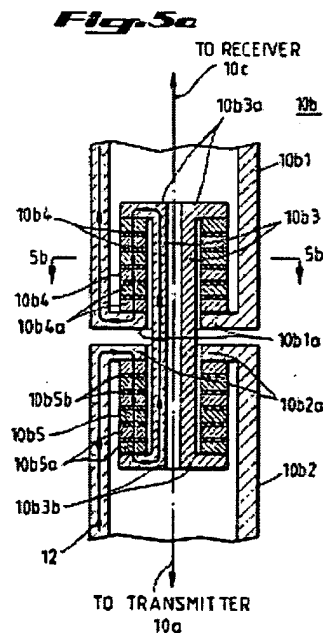
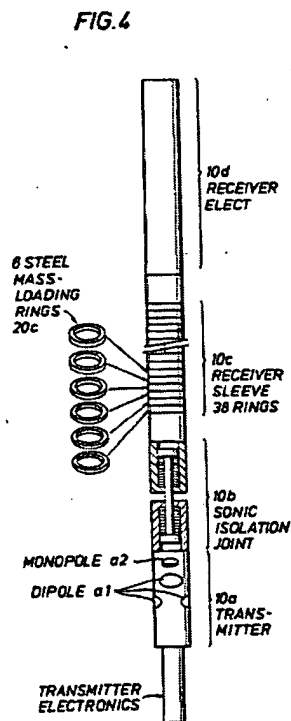
The groupings above are for purposes of this appeal only. The groupings should not be construed to mean the patentability of any of the claims may be determined, in later actions before a court, based on the grouping. Rather, the presumption of 35 U.S.C. § 282 shall apply to each claim individually.

VIII. ARGUMENT

The Examiner uses two references, *Hoyle* and *Blake*, in rejecting the independent claims of the present application. Before discussing particular claims, it is helpful to put in context the teachings of both *Hoyle* and *Blake*.

A. The Examiner's Primary Reference, *Hoyle*

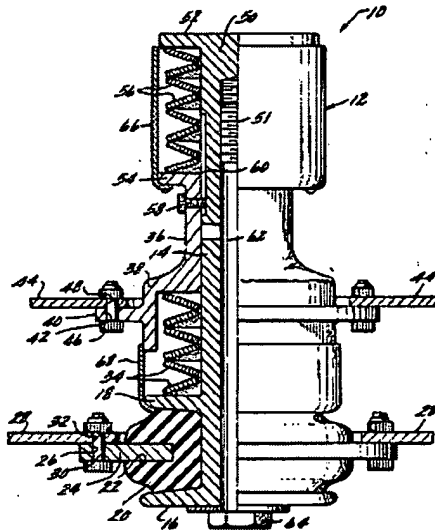
Hoyle is directed to a sonic well tool including a attenuation and delay apparatus. *Hoyle's* Title; Abstract. Figure 4 of *Hoyle* is reproduced below and shows a well tool having a transmitter, a receiver, and a sonic isolation joint. See *Hoyle*, Fig. 4 and Col. 5, Lines 8-16. Figure 5a of U.S. Patent 4,872,526 is also reproduced below, and incorporated by reference into *Hoyle*, and shows a detailed view of a sonic isolation joint including a plurality of interleaved rubber like washers and metal washers. Col. 5, Lines 39-44.



The sonic isolation joint of *Hoyle* also includes an outer housing having a continuous pattern of interruptions disposed through the housing. *Hoyle*, Col. 8, Lines 1-6. The outer housing encloses an inner housing including a plurality of bellows sections interconnected by a plurality of support rings. *Hoyle*, Col. 9, Lines 4-6. The bellows sections are loose and flexible, providing for acoustic compressional and flexural wave propagation. *Hoyle*, Col. 8, Lines 26-46.

B. The Examiner's Secondary Reference, *Blake*

Blake is directed to a shock and vibration isolation mount for marine gas turbines. *Blake* Title, and Col. 2, Lines 1-10. As shown in the Figure from *Blake*, reproduced immediately below, the mount includes a flat ring 24 embedded in an elastomeric grommet 20 disposed around a hollow rod 14. *Blake*, Col. 2, Line 38-57. A flange 40 is supported by a sleeve 36 that translatably surrounds the hollow rod 14. *Blake*, Col. 2, Line 58 to Col. 3, Line 13. A plurality of "Belleville" springs 35, 56 are positioned on either end of the sleeve to dampen shock loads transmitted into flange 40. *Blake*, Col. 1, Lines 59-66 and Col. 3, Lines 20-25.



Belleville springs are disc-shaped metal springs that have a variable incremental deflection so that shock loads are increasingly attenuated with a high degree of damping to provide soft bottoming. *Blake*, Col. 4, Lines 2-6. "Shell casings 66 and 68 are provided to cover the stacked metal springs 56 and 34 respectively." *Blake*, Col. 3, Line 37-39.

C. The Combination of *Hoyle* and *Blake* Does Not Teach, or Render Obvious, All the Limitations of the Independent Pending Claims.

All of the rejected independent claims stand rejected as allegedly obvious over *Hoyle* in view of *Blake*. Applicants respectfully submit to the Board, however, that the combination of *Hoyle* and *Blake* does not render obvious all the limitations of the pending claims.

An obviousness analysis starts with the factual determinations of *Graham v. John Deere, Co.*, 282 U.S. 1, 17-18 (1966). These factual determinations are: the scope and content of the prior art; the difference between the prior art and the pending claims; the level of ordinary skill in this art, and whether objective evidence may be present which indicates obviousness or non-obviousness. *Id.*

Scope and Content of the Prior Art

In order to rely on a reference as a basis for rejection, the reference must either be in the Applicant's field of endeavor or, if not, then be reasonably pertinent to the particular problem with which the Applicant was concerned. *In re Oetiker*, 977 F.2d 1443, 1446 (Fed. Cir. 1992). With regard to the scope of the prior art, *Hoyle* discloses a sonic well tool that, like the claimed invention, is designed to support acoustic evaluation of subterranean formations. *Hoyle* is clearly in the Applicant's field of endeavor. In stark contrast, *Blake* discloses a mount for isolating marine gas turbines from high intensity shocks of underwater explosions. The claimed invention is not used to isolate or attenuate high intensity shocks.

Although the current invention is directed to the attenuation of acoustic signals, the Examiner considers *Blake* to be "relevant art directed to attenuation of axial load shock waves . . ." Final Office Action dated August 7, 2003. In contrast to the absorption of shock waves, acoustic attenuators are specifically designed to attenuate signals falling within a fairly narrow range of frequencies and amplitudes. Those devices that would be suitable for the absorption and dampening of shock waves would likely be too stiff to function as an acoustic attenuator and would not have been in the realm of those devices considered by the inventor. Because of the inherent differences in the nature, magnitude, and frequency of the vibration sought to be isolated, as well as the incompatible differences in dimensional envelope constraints and operating environment, the invention of *Blake* would not be within the field of endeavor of, or reasonably pertinent to, the problem being addressed by the current invention, namely the attenuation of acoustic signals. Because *Blake* can not be considered analogous art to the claimed invention, the Applicants request that the Board reverse the Examiner's rejections.

Non-obviousness of the Combination

When patentability is questioned as being obvious, the prior art references must suggest or teach the motivation to combine the references. *In re Sang Su Lee*, 277 F.3d 1338, 1343 (Fed. Cir. 2002). As stated in *In re Dembiczak*, 175 F.3d 994, 999 (Fed. Cir. 1999), "Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references." The burden of showing obviousness requires the examiner to show some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. *In re Fritch*, 972 F.2d 1260, 1265 (Fed. Cir. 1992).

The Examiner takes the position that "one having ordinary skill in the art [would] modify Hoyle et al's apparatus as taught by Blake to include a plurality of springs connected in series to form an elongated body; and a plurality of housings corresponding in number to and disposed about said springs for the purpose of attenuating high intensity shock waves." Final Office Action dated August 7, 2003. The Examiner seems to be arguing that is obvious to combine the elements found in the different references because the elements can be found in the references and allegedly correspond to elements in the claims. This seems to be quintessential hindsight-based obviousness reasoning. The Examiner cites no teachings or suggestions from either reference, or from other sources, to combine a downhole acoustic tool with an axial load shock absorber.

Although recognizing the requirement that "there must be some reason why one skilled in the art would be motivated to make the proposed combination . . .," the Examiner offers no reason. Final Office Action dated August 7, 2003. The Examiner states that "Blake is only relied upon on its teaching of one or more springs connected in series in a housing to attenuate axial load shock waves." *Id.* Although conceding that *Blake* offers no teaching or motivation to combine the references, the Examiner offers no explanation as to the motivation behind, or of the objective teaching to, the combination. Thus, the Examiner has failed to meet the burden of factually supporting the conclusion of obviousness and has failed to set forth a *prima facie* case for obviousness. The Applicant's request that the Board reverse the Examiner's rejections.

Differences between the Prior Art and the Pending Claims

The second factual determination of *Graham*, the difference between the prior art and the pending claims, will be discussed in reference to the claim groupings.

Claims 1, 5-7, 8-9, 11, 14-16, 18, and 22-23 stand together for purposes of this appeal.

Claims stand together for purposes of this appeal.

1. Claims 1, 5-7, 8-9, 11, 14-16, 18, and 22-23

Claim 1 is representative of the claims in the first group, and is reproduced below for convenience of the discussion.

1. An apparatus for performing acoustic investigation of a subterranean formation having a wellbore therethrough, comprising:
 - a transmitter configured to transmit acoustic signals;
 - a receiver configured to receive acoustic signals; and
 - an acoustic attenuation section disposed between said transmitter and said receiver and comprising one or more springs connected in series, each spring being disposed within a housing so that the housing limits the deflection of the spring under an axial load.

Although all the claim wording is important, of particular relevance for the determination that the Board must make is the limitation requiring "an acoustic attenuation section disposed between said transmitter and said receiver and comprising one or more springs connected in series, each spring being disposed within a housing so that the housing limits the deflection of the spring under an axial load."

The Examiner concedes that *Hoyle* does not disclose "a plurality of springs connected in series to form an elongated body; and a plurality of housings corresponding in number to and disposed about said springs." Final Office Action Dated August 7, 2003. The Examiner relies on *Blake* to teach "a plurality of springs connected in series to form an elongated body; and a plurality of housings corresponding in number to and disposed about said springs for attenuating high intensity shock waves." *Id.*

Applicants respectfully submit that *Blake* does not teach each spring being disposed within a housing so that the housing limits the deflection of the spring under an axial load. *Blake* includes two separate series of stacked metal springs 56 and 34, where each stack is covered by a

shell casing 66 and 68, respectively. *Blake*, Col. 3, Line 37-39. Although shell casings 66 and 68 may be considered housings, they do not act to limit the deflection of the springs. The specification of *Blake* makes no mention of a mechanical limit to the deflection of the springs, but seems to rely on the variable incremental deflection of the metal springs to assure soft bottoming. *Blake*, Col. 4, Lines 2-6. Having a housing that would limit the deflection of the springs would prevent the soft bottoming performance of the stacked metal springs. *Blake* also does not disclose any device or arrangement where each spring has a individual housing. Thus, not only does *Blake* not teach a system having an individual housing for each spring, it also does not teach a housing that limits the deflection of the springs. Therefore, the combination of *Blake* and *Hoyle* do not include all of the limitations found in the current claims. For this reason, Applicants respectfully submit that the Examiner has failed to make a *prima facie* case of obviousness with respect to these claims.

Based on the foregoing, Applicants respectfully submit that one of ordinary skill in the art, viewing *Blake* and *Hoyle*, would not be taught an acoustic attenuation device having one or more springs connected in series, each spring being disposed within a housing so that the housing limits the deflection of the spring under an axial load. Thus, Applicants request that the Board reverse the Examiner's rejections regarding these claims.

2. Claims 4, 10, 20-21, and 24

Claim 4 is representative of the claims in the group comprising 4, 10, 20-21 and 24. Each of these claims is dependent from one of the independent claims discussed above and further includes one or more components being coated with a resilient or attenuating material. As the claims in this group are dependent from claims discussed in reference to the first group, the arguments presented with reference to the first group of claims apply fully to these claims. The

issue of particular relevance to the Board with respect to this second set of claims is whether the combination cited by the Examiner renders obvious a resilient or attenuating coating material.

The Examiner rejected all the claims over *Hoyle* taken with *Blake* and *Shah et al.* (U.S. Patent 6,137,747). *Shah* teaches an acoustic transmitter having certain components coated with Teflon to preserve free axial movement. *Shah*, Col. 5, Lines 51-55.

Teflon coating is a hard surface coating intended to reduce friction between contacting surfaces. Teflon is neither a resilient material nor an attenuating material. Therefore, the reliance on *Shah* to teach a resilient or attenuating coating is improper. For this reason, Applicants respectfully submit that the Examiner has failed to make a *prima facie* case of obviousness with respect to these claims.

Based on the foregoing, Applicants respectfully submit that the claims in this second grouping (4, 10, 20-21 and 24) should be allowed. Thus, Applicants respectfully request the Board to reverse the Examiner's rejection of these claims.

IX. CONCLUSION

Applicants respectfully request a reversal of the Examiner's rejections and allowance of the pending claims.

In the course of the foregoing discussions, Applicants may have at times referred to claim limitations in shorthand fashion, or may have focused on a particular claim element. This discussion should not be interpreted to mean that the other limitations can be ignored or dismissed. The claims must be viewed as a whole, and each limitation of the claims must be considered when determining the patentability of the claims. Moreover, it should be understood that there may be other distinctions between the claims and the prior art which have yet to be raised, but which may be raised in the future.

If any fees are inadvertently omitted or if any additional fees are required or have been overpaid, please appropriately charge or credit those fees to Conley Rose, P.C. Deposit Account Number 03-2769.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Derek V. Forinash', is written over a horizontal line.

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CLAIMS APPENDIX

1. (original) An apparatus for performing acoustic investigation of a subterranean formation having a wellbore therethrough, comprising:
 - a transmitter configured to transmit acoustic signals;
 - a receiver configured to receive acoustic signals; and
 - an acoustic attenuation section disposed between said transmitter and said receiver and comprising one or more springs connected in series, each spring being disposed within a housing so that the housing limits the deflection of the spring under an axial load.
2. (previously presented) An apparatus for performing acoustic investigation of a subterranean formation having a wellbore therethrough, comprising:
 - a transmitter configured to transmit acoustic signals;
 - a receiver configured to receive acoustic signals; and
 - an acoustic attenuation section disposed between said transmitter and said receiver and comprising one or more springs connected in series, each spring being disposed within a housing so that the housing limits the deflection of the spring under an axial load, wherein said acoustic attenuation section further comprises a plurality of nodal masses disposed along said attenuation section.
3. (previously presented) The apparatus of claim 2 wherein said nodal masses aid in attenuation of low frequency signals and resist compression loads on the attenuation section.
4. (original) The apparatus of claim 1 wherein said springs are helical springs coated with a layer of resilient material.
5. (original) The apparatus of claim 1 wherein said springs have a stiffness of at least 10,000 pounds per inch of deflection.

6. (original) The apparatus of claim 1 wherein said springs have a stiffness of at less than 30,000 pounds per inch of deflection.
7. (original) The apparatus of claim 1 wherein the coils of said springs have radial holes extending therethrough.
8. (original) The apparatus of claim 1 wherein the outer surface of the spring is separated from the inner surface of the adjoining housing by at least 0.010 inches.
9. (original) The apparatus of claim 1 wherein the outer surface of the spring is separated from the inner surface of the adjoining housing by less than 0.100 inches.
10. (original) The apparatus of claim 1 wherein the outer surface of the housing is covered with an attenuating material.
11. (original) The apparatus of claim 1 further comprising one or more rod members adapted to interconnect between two springs.
12. (previously presented) An apparatus for performing acoustic investigation of a subterranean formation having a wellbore therethrough, comprising:
 - a transmitter configured to transmit acoustic signals;
 - a receiver configured to receive acoustic signals;
 - an acoustic attenuation section disposed between said transmitter and said receiver and comprising one or more springs connected in series, each spring being disposed within a housing so that the housing limits the deflection of the spring under an axial load, and wherein said acoustic attenuation section further comprises a plurality of nodal masses disposed along said attenuation section; and
 - one or more rod members adapted to interconnect between two springs, wherein said nodal masses are disposed about said rod members.

13. (previously presented) The apparatus of claim 12 further including a layer of resilient material disposed between at least one of said rod members and at least one of said nodal masses.
14. (original) The apparatus of claim 1 wherein said attenuation section is capable of axial loads of 100,000 pounds.
15. (original) The apparatus of claim 1 wherein said attenuation section is filled with fluid.
16. (original) An apparatus for attenuation of an acoustic signal comprising;
 - a plurality of springs connected in series to form an elongated body; and
 - a plurality of housings corresponding in number to and disposed about said springs;
 - wherein said housing limits the axial deflection of said springs.
17. (previously presented) An apparatus for attenuation of an acoustic signal comprising;
 - a plurality of springs connected in series to form an elongated body;
 - a plurality of housings corresponding in number to and disposed about said springs;
 - wherein said housing limits the axial deflection of said springs; and
 - a plurality of nodal masses corresponding in number to said springs and disposed along the length of the body.
18. (original) The apparatus of claim 16 further comprising a plurality of rod members axially interconnected between two springs.
19. (previously presented) An apparatus for attenuation of an acoustic signal comprising;
 - a plurality of springs connected in series to form an elongated body;
 - a plurality of housings corresponding in number to and disposed about said springs;

wherein said housing limits the axial deflection of said springs; and a plurality of masses and a plurality of rod members, wherein said rod members are axially disposed between and connected to adjacent springs and said masses are positioned about said rod members.

20. (original) The apparatus of claim 16 wherein said mass is separated from said rod members by a layer of attenuating material.

21. (original) The apparatus of claim 16 wherein said springs are coated with a layer of resilient material.

22. (original) The apparatus of claim 16 wherein said springs are helical springs with a minimum stiffness of 10,000 lbs/in.

23. (original) The apparatus of claim 16 wherein a circumferential gap of between 0.010 and 0.100 inches is maintained between the outside surface of said spring and the inside surface of said housing.

24. (original) The apparatus of claim 16 wherein the outside surface of said housings are coated with an attenuating material.

25. (original) A method for attenuating acoustic energy transmitted along an acoustic tool, wherein the acoustic tool comprises a transmitter section, a receiver section, and an attenuation section disposed between the transmitter and receiver sections, comprising:

transmitting acoustic energy from the transmitter section into the attenuation section;

transmitting acoustic energy through the attenuation section to produce an attenuated acoustic energy, wherein the attenuation section comprises a one or more springs connected in series, a corresponding number of housings disposed about the springs, and a corresponding number of nodal masses; and

receiving the attenuated acoustic energy at the receiver.

26. (original) A method for transmitting acoustic energy along an acoustic tool, wherein the acoustic tool comprises a transmitter section, a receiver section, and an attenuation section disposed between the transmitter and receiver sections, comprising:

receiving acoustic energy from the transmitter with a first spring, wherein the first spring is enclosed within a housing that prevents extension of the spring beyond a predetermined limit;

receiving acoustic energy from the first spring with a connecting rod; wherein the connecting rod possesses a nodal mass that prevents compression of the spring beyond a predetermined limit;

receiving acoustic energy from the connecting rod with a second spring; and

receiving acoustic energy with the receiver via the second spring, wherein the acoustic energy received via the second spring is attenuated relative to the acoustic energy received by the first spring for all frequencies greater than 500 Hz.